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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,984	08/18/2005	Holger Thielert	THIELERT -4 PCT	1926

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EXAMINER	
WU, IVES J	

ART UNIT	PAPER NUMBER
1797	

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08/24/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/521,984	THIELERT, HOLGER	
	Examiner	Art Unit	
	IVES WU	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 July 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

(1). Applicant's Amendments and Remarks filed on 7/1/2010 have been received and considered.

The rejections of claims 1-2 and 4-6 in prior Office Action dated 12/31/2009 is withdrawn in view of the current Amendments and Remarks.

However, a new ground of rejection for claims 1-2, 4-6 is introduced in the following.

Claims 1- 2 and 4-6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In claim 1 "without further processing" does not find support in the sepcificationas originally filed. This is a new matter rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

(3). **Claims 1-2, 4-5** are rejected under 35 U.S.C. 103(a) as being unpatentable over Laslo et al (US 4198386) in view of Hyde (US 4940081), evidenced by Reed (US 4507275), Heisel et al (US 5676921), Hatta et al (US 5845610A).

As to method for isolating hydrogen sulfide from coke oven gas with subsequent recovery of elemental sulfur in a Claus plant, in which the hydrogen sulfide is removed from the coke oven gas by means of gas scrubbing, using an absorption liquid, the charged absorption liquid is regenerated and in this connection, hydrogen sulfide is passed to the Claus plant in **independent claim 1**, Laslo et al (US 4198386) disclose Selective Removal of a Gaseous Component from a Multi-Component Gas Stream (Title). More particularly, there is a need to maintain the concentration of H_2S in the acid gas stream derived from the treatment of Coke Oven Gas so that a downstream **Claus Plant** will not become inoperative when the Coke Oven Gas flow rate significantly decreases (Col. 4, ln. 18-22). It is illustrated in figure 10 below: H_2S absorption column 110, H_2S desorption column 132, gas input 112, absorbent solution MEA (monoethanolamine), H_2S and CO_2 containing foul gas line 142.

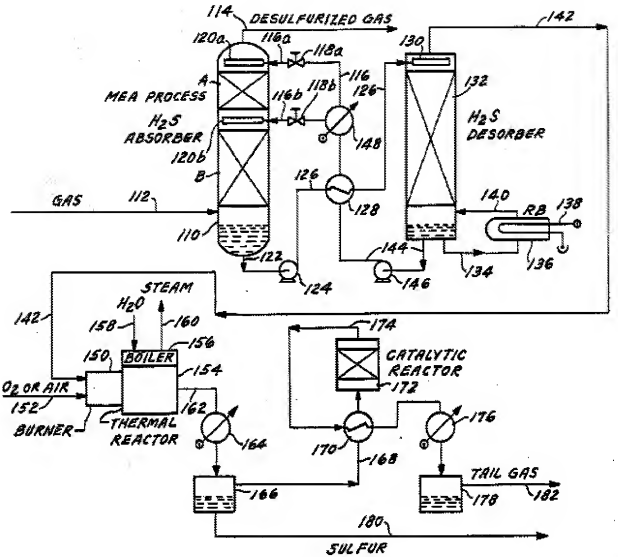

FIG. 10

As to wherein the hydrogen sulfide is reacted with oxygen in the air, in a Claus boiler of the Claus plant forming elemental sulfur in **independent claim 1**, Laslo et al (US 4198386) disclose the amount of oxygen admitted to burner (Claus boiler-thermal reactor) to be amount sufficient to oxidize one-third of the H_2S in the foul gas so that the ratio H_2S:SO_2 in the oxidized gas is 2:1, the stoichiometric ratio for reversible reaction of H_2S and SO_2 to produce elemental sulfur according to the chemical equation:

$$2H_2S + SO_2 \Leftrightarrow 3S + 2H_2O$$

As to wherein the process gas that leaves the Claus boiler is cooled to the temperature required for condensation of the sulfur in a waste heat reboiler, heated after the sulfur has been precipitated, and passed to a reaction oven of the Claus plant in which sulfur compounds are converted to elemental sulfur on a catalyst and wherein the process gas that leaves the reaction oven is cooled to a temperature required for condensation of the sulfur and condensed sulfur is precipitated in **independent claim 1**, as shown in figure above, cooling coil or heat exchanger/condenser 164, 176, catalytic reactor 172, hot gas and entrained sulfur vapor 162,sulfur collection tank 166, 178, heat exchanger 170. As evidenced by Heisel et al (US 5676921) that condenser 10 can be a waste heat reboiler in Figure.

As to wherein Claus plant is operated with only a single reaction oven and wherein the reaction oven is operated in a temperature range between 200°C and less than 250°C in **independent claim 1**, wherein the reaction oven is operated in a temperature range between 200° C and 230° C in **claim 2**, Laslo et al do not teach the operating temperature range for the reaction oven, however, it is known that catalytic reactor of Claus plant which can be operated in the temperature ranged between 200 to 250°C as evidenced by Reed (US 4507275) that catalytic reactor is operated between 232°C ~ 343°C, and 2nd catalytic reactor between 177 ~ 216°C **for additional elemental sulfur removal**. In absence of showing criticality of the records, the optimized operating temperature for Claus reactor to be 200 ~ 250° C in such a known process render *prima facie obvious* within one of ordinary skills in the art, *In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).*

As to wherein the process gas that leaves the reaction oven after precipitation of condensed sulfur is passed back without further processing into the coke oven gas to be cleaned ahead of gas scrubbing with a residual content of hydrogen sulfide that was not converted in the reaction oven in **independent claim 1**, Laslo et al (US 4198386) disclose the tail gas from catalytic reactor 172 passing via the collector tank 178 through line 182 to equipment for further treatment as is common in the art such as additional catalytic reactors, incineration and emission into the atmosphere, oxidation and recycling of the SO_2 to the Claus reactor or reduction and recycling of the SO_2 to the Claus reactor, or reduction and recycling of the H_2S to the Claus reactor or **absorption column** (Col. 26, ln. 13-19).

As to wherein a boiler lined with a refractory material, lying horizontally is used as Claus boiler which has a combustion chamber and a catalyst chamber having a catalyst bulk material which follows horizontally and is delimited on both sides by gas-permeable checker bricks in **independent claim 1**, it would be obvious to have refractory material for boiler because chosen known material for suitability renders obvious, *In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960)*. As evidenced by Hatta et al (US 5845610) the Refractory protective blocks and protective wall structure of boiler. It also would be obvious to have boiler and thermal reactor (combustion chamber, catalyst chamber) lying horizontally because rearrangements of parts, *In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)*.. it would contains a catalyst bulk material for the catalytic reaction and containing means to hold the catalyst as evidenced by Luinstra et al (GB 2221853A) that Claus reaction furnace has a refractory material having a working temperature of at least 1100°C which supports for holding catalytically active substance (Abstract, page 4, ln. 1-3). Laslo et al, Luinstra et al **do not teach** the checker bricks for the delimiter (wall) as claimed.

However, Hyde (US 4940081) **teaches** checker brick (Title). It relates to the art of refractory bricks and, more particularly, to checker bricks used for recovering heat in recuperators.

The advantage of checker bricks as wall is to have optimum heating surface area and that is relatively simple to manufacture and install (Col. 1, ln. 8-10).

Therefore, it would have been obvious at time of the invention to install the checker bricks of Hyde for the wall to support the catalyst disclosed by Luinstra et al in the thermal reactor of Laslo et al in order to attain the advantages cited previously.

As to wherein the waste heat boiler has a 1st tube bundle composed of heat exchanger tubes, through which the process gas that exits from the Claus boiler flows wherein the waste heat boiler has a 2nd tube bundle composed of heat exchanger tubes through which the process gas that exits from the reaction oven flows and wherein the tube bundles are disposed in a common steam generator chamber in which low-tension steam is generated in **claim 4**, as shown in figure above, the boiler 156, water 158, steam 160, as well as cooling coil or heat exchanger/condenser 164, it is well known in the art that heat exchanger has design tubes in the art. Laslo et al do not teach combining two heat exchangers disposed in common steam

generator, it would be obvious to have them together in one chamber as well as separated in two units because rearrangement of parts renders obviousness, *In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975).*

As to wherein elemental sulfur is drawn off from the waste heat boiler in liquid form in **claim 5**, Laslo et al (US 4198386) disclose molten sulfur (Col. 25, ln. 63).

(4). **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Laslo et al (US 4198386) in view of Hyde (US 4940081), further in view of Heisel et al (US 5628977A).

As to a partial stream being branched out of the hot process gas that leaves the Claus boiler and mixed into the process stream that is passed to the reaction oven to heat it in **claim 6,** Laslo et al (US 4198386) disclose heat exchanger 170. Laslo et al **do not teach** the missing of stream of waste gas from Claus furnace with process stream that is passed to the reaction oven as claimed.

However, Heisel et al (US 5628977A) **teach** process for the desulfurization of a crude gas containing H_2S (Title). In Figure 2, a part of Claus reactor waste gas is limited quantitatively by control valve 14 on pipe 13, drawn off hot gas from Claus furnace, while the residual Claus reactor waste gas is cooled by evaporation of boiler feed-water 15 and drawn off via pipe 18. The steam generated by evaporation of boiler feed-water accumulates in pipe 16. With the cooling of condensed elementary sulfur, it is drawn off via pipe 17 from Claus furnace 12 (Col. 6, ln. 25-34). The Claus furnace waste gas at hand in pipe 21 after cooling 19 is mixed with hotter Claus furnace waste gas from pipe 13 and fed via pipe 22 to catalytic reactor 23. Control valve 14 is adjusted in this case in such a way that the gas stream in pipe 22 has a temperature of 170°C to 220°C (col. 6, ln. 37-42).

Therefore, it would have been obvious at time of the invention to have branch of waste gas from Claus furnace to mix with th waste gas to the catalytic oven disclosed by Heisel for the gas stream to the catalytic reactor of Laslo et al in order to achieve the advantages described previously.

Response to Arguments

(5). Applicant's arguments, see page 5-11, Remarks, filed on 7/1/2010, with respect to the rejection(s) of claim(s) 1-2,4-6 under 103 in view of combined teaching of Tarhan et al (US

4124685), Hyde (US 4940081) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Laslo et al (US 4198386), Hyde (US 4940081).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu
Art Unit: 1797
Date: August 20, 2010

/Duane Smith/
Supervisory Patent Examiner, Art Unit 1797